

said predetermined transmitter code by the manufacturer thereof so that no one else is required to encode said transmitter;

vehicle antitheft means;

15 a system control unit disposed within said vehicle, comprising:

(i) receiving means operable during a system program mode and a system operating-receiving mode for receiving said transmitted encoded signal and
20 generating an electrical signal representative of the encoded signal;

(ii) a digital memory for storing data representative of signature code signals;

25 (iii) programming means for recording in said digital memory received signals for arming or disarming said vehicle antitheft means, said means activated only during said system program mode for automatically storing in said memory received signals representative of said predetermined transmitter code as a signature control signal for
30 arming or disarming said vehicle antitheft means;

(iv) operating means activated during said operating-receiving mode for comparing received electrical signals with said signature control
35 signal stored in said memory means to determine if said electrical signals correspond to said recorded signature code signal, and means for arming or disarming said vehicle antitheft means in response to received signals corresponding to said signature
40 code signal stored in said memory; and

wherein said transmitter and said receiving means cooperate to form a one-way radio frequency signal.

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transmission link for communicating signals only from
said transmitter to said receiving means, said transmis-
sion link being employed by said system during said
programming mode for transmitting said encoded signals
from said transmitter to said access control unit to be
stored in said memory as said code signals, said link
further employed during said operating receiving mode for
transmitting said encoded signals from said transmitter
to said control unit.

65. The vehicle security system of Claim 64 further
characterized in that said system control unit is operable in
the program mode to automatically record a plurality of
different transmitter codes, and wherein said system control
unit is responsive to received signals corresponding to any
one of said stored transmitter codes for arming or disarming
said vehicle antitheft means.

66. The vehicle security system of Claim 64 further
characterized in that said system control unit comprises a
user-accessible switch disposed in said vehicle, and said
access control unit is responsive to the position of said
switch for entering said program mode.

67. The vehicle security system of Claim 64 further
characterized in that said system control unit is responsive
to signature code signals received from a plurality of
transmitters when the system is in the program mode for
automatically recording each of the signature code signals
from the plurality of transmitters as valid signature code
signals for arming or disarming said vehicle antitheft means,
so that in the operating-receiving mode, the transmitted

10 encoded signals from any of said plurality of transmitters are received and compared against each of said plurality of recorded signature code signals to determine if a valid signature code word has been received, said plurality of transmitters and said receiving means being operable at the same radio frequency.

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5 68. The vehicle security system of Claim 64 further characterized in that said transmitter is capable of generating a plurality of different encoded signals, and said system control unit is operable in said program mode to record said plurality of different encoded signals, each for a predetermined channel.

5 69. An electronically programmable remote control vehicle security system, in which a receiver and a control unit therefor are operable upon receipt of a proper transmitted encoded signal from any of a plurality of transmitters to arm or disarm said vehicle security system, said system comprising:

10 at least one first transmitter capable of transmitting a first receiver responsive, radio frequency, digitally encoded signal comprising an N-bit digital code word for arming and disarming of said system, said transmitter comprising actuating means for actuating said transmitting of said signal so that said first signal is automatically transmitted upon actuation;

15 at least one second transmitter capable of generating and transmitting a second receiver responsive, radio frequency, digitally encoded signal comprising an M-bit digital code word for arming and disarming said system, said second transmitter comprising actuating means for

actuating said transmitting of said second signal so that
said first signal is automatically transmitted upon
actuation;

wherein each digitally encoded signal may comprise
a different finite number of bits;

vehicle antitheft means;

a receiver located in said vehicle and responsive to
the transmitted radio frequency encoded signals during a
system programming mode and a system operating-receiving
mode for generating electrical signals corresponding to
each of the respectively encoded signals;

said receiver and said first and second transmitters
comprising at least first and second one-way radio
frequency signal transmission links for communicating
signals only from said first or second transmitters to
said receiver during said system programming and system
operating-receiving modes; and

a control unit operatively associated with the
receiver, said control unit comprising:

(i) means for decoding said electrical signals
to generate respective decoded digital signals
representative of said N-bit code word and said M-
bit code word;

(ii) a digital memory for storing said N and M-
bit code words;

(iii) means operable in said system program
mode for automatically recording in said digital
memory a plurality of said respective decoded
digital signals of different code bit lengths
received and decoded during said program mode as
first and second signature code signals representa-

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50 tive of said N-bit code word and said M-bit code
word; and

55 (iv) means activated during an operating-receiv-
ing mode for comparing received and decoded signals
of different bit lengths to each of said first and
second signature code signals which have been
previously recorded during said program mode to
determine if said decoded digital signals corre-
spond to either of the recorded signature code
signals and thereby represent valid signals for
arming or disarming said vehicle antitheft means.
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70. The vehicle security system of Claim 69 further
characterized in that said control unit is a microprocessor
operated control unit.

71. The vehicle security system of Claim 69 further
characterized in that said system is user programmable such
that the user of any transmitter may initially record the
encoded signal from that transmitter as a signature code
5 signal in the control unit by simple actuation of the trans-
mitter when the system is in said program mode for recording
signature control signals for arming or disarming said vehicle
antitheft means, thereafter only requiring the transmission of
the encoded signal from the transmitter for recording as a
10 valid signature code signal, and whereby said signal control
signal is automatically recorded in said digital memory.

72. The vehicle security system of Claim 69 further characterized in that said system is provided with a switch disposed in said vehicle to put the receiver in the program mode for recording said arming/disarming signature control words..

73. A vehicle security system in which a control unit is responsive to receipt of a proper transmitted encoded radio frequency signal from a transmitter to arm or disarm said system, comprising:

vehicle antitheft means, said means comprising a vehicle ignition disabling means;

a portable hand-held transmitter comprising means for generating and transmitting a predetermined fixed digitally encoded, radio frequency, receiver-responsive signal representative of a predetermined transmitter code, wherein said predetermined transmitter code comprises a non-user-programmable N-bit digital word; and

a control unit located within said vehicle, comprising:

(i) radio frequency signal receiving means operable during said program mode and during said system operating-receiving mode for receiving said transmitted encoded signal and generating an electrical signal representative of the encoded signal;

(ii) a digital memory for storing signature code signals;

(iii) programming means for recording in said digital memory received signals for arming or disarming said vehicle antitheft means, said means activated only during a system program mode for automatically storing in said memory said electri-

cal signals representative of said radio frequency, receiver-responsive received signals representative of said predetermined transmitter code as a signature code signal for arming or disarming said vehicle antitheft means; and

(iv) operating means activated during an operating-receiving mode for comparing received electrical signals with said signature code signal stored in said memory means to determine if said electrical signals correspond to said recorded signature code signal and for arming or disarming said antitheft means if said electrical signals correspond to said recorded signature code signal, wherein said transmitter and said receiver means cooperate to form a one-way radio frequency signal transmission link for communication signals only from said transmitter to said receiving means, said transmission link being employed by said system during said programming mode for transmitting said signal representative of said transmitter code to said access control unit to be stored in said memory means as signature code signals, said link further employed during said operating-receiving mode for transmitting said encoded signal from said transmitter to said access control unit.

74. The vehicle security system of Claim 73 further characterized in that said access control unit is operable in the program mode to automatically record a plurality of different transmitter codes from a plurality of different transmitters and wherein said control unit is responsive to received signals corresponding to any one of said stored

transmitter codes for arming or disarming the vehicle anti-theft means.

5 75. The vehicle security system of Claim 73 wherein said control unit is hidden from view within said vehicle at a relatively secure location not visible either from outside the vehicle or from passenger locations within the passenger compartment of said vehicle, and said system further comprises a switch accessible only within said vehicle for selective actuation by the system operator, said control unit being responsive to actuation of said switch for entering the program mode.

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5 76. The vehicle security system of Claim 73 further characterized in that said access control unit is responsive to signature code signals received from a plurality of transmitters when the access control unit is in the program mode for automatically recording each of the signature code signals from the plurality of transmitters as valid signature code signals, so that in the operating-receiving mode, the transmitted encoded signals from any of said plurality of transmitters are received and compared against each of said

10 plurality of recorded signature code signals to determine if a valid signature code word has been received.

77. The vehicle security system of Claim 75 further characterized in that said transmitter is capable of generating a plurality of different encoded signals.

78. The vehicle security system of Claim 73 wherein said transmitter is suitably encoded with said transmitter code by the manufacturer thereof so that the system user is not required to encode said transmitter.

79. The vehicle security system of Claim 73 wherein said transmitter comprises means for selectively generating and transmitting either a first or a second predetermined digitally encoded, radio frequency signal representative of first or second predetermined transmitter codes, said control unit is operable in the program mode to record respective signals representative of said first or second transmitter codes, and wherein said operating means comprises means for arming or disarming said antitheft means in response to receipt of signals corresponding to said first code, and means for performing a second predetermined function in response to signals corresponding to said second transmitter code.

80. An electronically programmable remote control vehicle security system, comprising:

a multi-channel remote control transmitter comprising means for generating and transmitting a plurality of predetermined digitally encoded, radio frequency, signals representative of a plurality of predetermined transmitter channel signature codes, and user-activated means for selecting and transmitting respective one of said signals, and wherein said transmitter is suitably encoded with said predetermined transmitter code by the manufacturer thereof so that the system user is not required to encode said transmitter;

vehicle antitheft means;

15 a system control unit disposed within said vehicle,
comprising:

(i) receiving means operable during a system
program mode and a system operating-receiving mode
for receiving said transmitted encoded signal and
generating an electrical signal representative of
20 the encoded signal;

(ii) a digital memory for storing data repre-
sentative of signature code signals, said memory
comprising a plurality of assigned memory locations
for storing signature code signals for each of said
25 channels;

(iii) programming means activated only during
said system program mode for selecting a particular
channel and storing in an assigned memory location
in said memory received signals representative of
30 said predetermined transmitter channel code as a
signature channel control signal;

(iv) operating means activated during said
operating-receiving mode for comparing received
electrical signals with said signature control
35 signal stored in said memory means to determine if
said electrical signals correspond to said recorded
signature code signal, and means for determining
the channel having a corresponding signature chan-
nel control signal stored therein, and responsive
40 action means for the respective identified channel
activated upon receipt of a matching channel signa-
ture code; and

wherein said transmitter and said receiving means
cooperate to form a one-way radio frequency signal
45 transmission link for communicating signals only from

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said transmitter to said receiving means, said transmission link being employed by said system during said programming mode for transmitting said encoded signals from said transmitter to said access control unit to be stored in said memory as said code signals, said link further employed during said operating receiving mode for transmitting said encoded signals from said transmitter to said control unit.

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81. The vehicle security system of Claim 80 further characterized in that said system control unit is operable in the program mode to record a plurality of different transmitter codes for each of the respective channels.

82. The vehicle security system of Claim 80 wherein said transmitter comprises a microprocessor controller and a non-volatile memory for storing digital channel signature code data.

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83. The vehicle security system of Claim 80 wherein said plurality of channels comprises at least a first channel and a second channel, and wherein said first channel is assigned to control the arming and disarming of said vehicle antitheft means, and wherein said responsive action means comprises means responsive during the system operating-receiver mode to receipt of a transmitted signal which matches a stored channel one signature code for arming or disarming said vehicle antitheft means.

84. The vehicle security system of Claim 83 wherein said system control unit comprises a microprocessor controller and said digital memory comprises a random access memory.

85. The vehicle security system of Claim 84 wherein said memory comprises an electrically erasable programmable read only memory.

86. The vehicle security system of Claim 84 further comprising a battery back-up voltage supply source for providing back-up power to said memory.

87. The vehicle security system of Claim 83 wherein said responsive action means comprises a control unit output signal assigned to said second channel, and means responsive during said system operating-receive mode to receipt of a transmitted signal which matches a stored channel two signature code for activating said second channel output signal.

88. The vehicle security system of Claim 80 further characterized in that said system control unit is responsive to signature code signals received from a plurality of transmitters when the system is in the program mode for recording each of the signature code signals from the plurality of transmitters as valid signature code signals for a particular channel, so that in the operating-receiving mode, the transmitted encoded signals from any of said plurality of transmitters are received and compared against each of said plurality of recorded signature code signals to determine if a valid signature code word has been received, said plurality of transmitters and said receiving means being operable at the same radio frequency.

89. An electronically programmable remote control vehicle security system, comprising:

a precoded portable hand-held transmitter comprising means for generating and transmitting a predetermined fixed, digitally encoded, radio frequency, receiver-responsive signal representative of a predetermined fixed transmitter code, and actuating means for actuating said generating and transmitting means so that said signal is automatically generated and transmitted upon actuation;

vehicle antitheft means;

a system control unit disposed within said vehicle, comprising:

(i) receiving means operable during a system program mode and a system operating-receiving mode for receiving said transmitted encoded signal and generating an electrical signal representative of the encoded signal;

(ii) a digital memory for storing data representative of signature code signals;

(iii) programming means for recording in said digital memory received signals for arming or disarming said vehicle antitheft means, said means activated only during said system program mode for automatically storing in said memory received signals representative of said predetermined transmitter code as a signature control signal for arming or disarming said vehicle antitheft means, said programming means further characterized in that said program mode is automatically terminated after a predetermined time delay from receipt of the last transmitted encoded signal during said program mode;

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(iv) operating means activated during said operating-receiving mode for comparing received electrical signals with said signature control signal stored in said memory means to determine if said electrical signals correspond to said recorded signature code signal, and means for arming or disarming said vehicle antitheft means in response to received signals corresponding to said signature code signal stored in said memory;

(v) a use-accessible switch disposed in said vehicle, and said access control unit is responsive to the position of said switch for entering said program mode; and

wherein said transmitter and said receiving means cooperate to form a one-way radio frequency signal transmission link for communicating signals only from said transmitter to said receiving means, said transmission link being employed by said system during said programming mode for transmitting said encoded signals from said transmitter to said access control unit to be stored in said memory as said code signals, said link further employed during said operating receiving mode for transmitting said encoded signals from said transmitter to said control unit.

90. An electronically programmable remote control vehicle security system, in which a receiver and a control unit therefor are operable upon receipt of a proper transmitted encoded signal from any of a plurality of transmitters to arm or disarm said vehicle security system, said system comprising:

at least one first transmitter capable of transmitting a first receiver responsive, radio frequency, digitally encoded signal comprising an N-bit digital code word for arming and disarming said system, said transmitter comprising actuating means for actuating said transmitting of said signal so that said first signal is automatically transmitted upon actuation;

at least one second transmitter capable of generating and transmitting a second receiver responsive, radio frequency, digitally encoded signal comprising an M-bit digital code word for arming and disarming said system, said second transmitter comprising actuating means for actuating said transmitting of said second signal so that said first signal is automatically transmitted upon actuation;

wherein N need not equal M, and wherein said first and second transmitter are respectively suitably encoded with said N-bit and said M-bit digital codes by the respective manufacturer thereof so that the system user is not required to encode said respective transmitters; vehicle antitheft means;

a receiver located in said vehicle and responsive to the transmitted radio frequency encoded signals during a system programming mode and a system operating-receiving mode for generating electrical signals corresponding to each of the respectively encoded signals;

said receiver and said first and second transmitters comprising at least first and second one-way radio frequency signal transmission links for communicating signals only from said first or second transmitters to said receiver during said system programming and system operating-receiving modes; and

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40 a control unit operatively associated with the receiver, said control unit comprising:

(i) means for decoding said electrical signals to generate respective decoded digital signals representative of said N-bit code word and said M-bit code word;

45 (ii) a digital memory for storing said N and M-bit code words;

(iii) means operable in said system program mode for automatically recording in said digital memory said respective decoded digital signals received and decoded during said program mode as first and second signature code signals representative of said N-bit code word and said M-bit code word; and

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55 (iv) means activated during an operating-receiving mode for comparing received and decoded signals to said first and second signature code signals which have been previously recorded during said program mode to determine if said decoded digital signals correspond to either of the recorded signature code signals and thereby represent valid signals for arming or disarming said vehicle anti-theft means.

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91. An electronically programmable remote control vehicle security system, in which a receiver and a control unit therefor are operable upon receipt of a proper transmitted encoded signal from any of a plurality of transmitters to
5 arm or disarm said vehicle security system, said system comprising:

at least one first transmitter capable of transmitting a first receiver responsive, radio frequency, digitally encoded signal comprising an N-bit digital code word for arming and disarming said system, said transmitter comprising actuating means for actuating said transmitting of said signal so that said first signal is automatically transmitted upon actuation;

at least one second transmitter capable of generating and transmitting a second receiver responsive, radio frequency, digitally encoded signal comprising an M-bit digital code word for arming and disarming said system, said second transmitter comprising actuating means for actuating said transmitting of said second signal so that said first signal is automatically transmitted upon actuation;

wherein N need not equal M;

vehicle antitheft means;

a receiver located in said vehicle and responsive to the transmitted radio frequency encoded signals during a system programming mode and a system operating-receiving mode for generating electrical signals corresponding to each of the respectively encoded signals;

said receiver and said first and second transmitters comprising at least first and second one-way radio frequency signal transmission links for communicating signals only from said first or second transmitters to said receiver during said system programming and system operating-receiving modes; and

a control unit operatively associated with the receiver, said control unit comprising:

(i) means for decoding said electrical signals to generate respective decoded digital signals

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representative of said N-bit code word and said M-bit code word;

(ii) a digital memory for storing said N and M-bit code words;

(iii) means operable in said system program mode for automatically recording in said digital memory said respective decoded digital signals received and decoded during said program mode as first and second signature code signals representative of said N-bit code word and said M-bit code word, and wherein said system program mode is automatically terminated after a pre-established time delay from receipt of the last transmitted encoded signal during said program mode;

(iv) means activated during an operating-receiving mode for comparing received and decoded signals to said first and second signature code signals which have been previously recorded during said program mode to determine if said decoded digital signals correspond to either of the recorded signature code signals and thereby represent valid signals for arming or disarming said vehicle anti-theft means; and

(v) a switch disposed in said vehicle to put the system in the program mode for recording said arming/disarming signature control word.

92. A vehicle security system in which a control unit is responsive to receipt of a proper transmitted encoded radio frequency signal from a transmitter to arm or disarm said ~~system, comprising:~~

5 vehicle antitheft means, said means comprising a vehicle ignition disabling means;

10 a portable hand-held transmitter comprising means for generating and transmitting a predetermined fixed digitally encoded, radio frequency, receiver-responsive signal representative of a predetermined transmitter code; and

15 a control unit located within said vehicle and hidden from view within said vehicle at a relatively secure location not visible either from outside the vehicle or from passenger locations within the passenger compartment of said vehicle, comprising:

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20 (i) radio frequency signal receiving means operable during said program mode and during said system operating-receiving mode for receiving said transmitted encoded signal and generating an electrical signal representative of the encoded signal;

(ii) a digital memory for storing signature code signals;

25 (iii) programming means for recording in said digital memory received signals for arming or disarming said vehicle antitheft means, said means activated only during a system program mode for automatically storing in said memory said electrical signals representative of said radio frequency, receiver-responsive received signals representative of said predetermined transmitter code as a signature code signal for arming or disarming said vehicle antitheft means, said program mode being automatically terminated after a predetermined time
30 delay from receipt of the last transmitted encoded signal; and
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(iv) a switch accessible only within said vehicle for selective actuation by the system operator, said control unit being responsive to actuation of said switch for entering the program mode;

(v) operating means activated during an operating-receiving mode for comparing received electrical signals with said signature code signal stored in said memory means to determine if said electrical signals correspond to said recorded signature code signal and for arming or disarming said antitheft means if said electrical signals correspond to said recorded signature code signal, wherein said transmitter and said receiver means cooperate to form a one-way radio frequency signal transmission link for communication signals only from said transmitter to said receiving means, said transmission link being employed by said system during said programming mode for transmitting said signal representative of said transmitter code to said access control unit to be stored in said memory means as signature code signals, said link further employed during said operating-receiving mode for transmitting said encoded signal from said transmitter to said access control unit.

93. A vehicle security system in which a control unit is responsive to receipt of a proper transmitted encoded radio frequency signal from a transmitter to arm or disarm said system, comprising:

vehicle antitheft means, said means comprising a vehicle ignition disabling means;

10 a portable hand-held transmitter comprising means
for generating and transmitting either a first or second
predetermined fixed digitally encoded, radio frequency,
receiver-responsive signal representative of first or
second predetermined transmitter codes; and

a control unit located within said vehicle, comprising:

15 (i) radio frequency signal receiving means
operable during said program mode and during said
system operating-receiving mode for receiving said
transmitted encoded signal and generating an electrical
signal representative of the encoded signal;

20 (ii) a digital memory for storing signature
code signals;

25 (iii) programming means for recording in said
digital memory received signals representative of
said first or second transmitter codes, said means
activated only during a system program mode for
automatically storing in said memory said electrical
signals representative of said radio frequency,
receiver-responsive received signals representative
of said first or second predetermined transmitter
codes as first or second signature code signals;
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35 (iv) operating means activated during an operating-receiving mode for comparing received electrical signals with said signature code signal stored in said memory means to determine if said electrical signals correspond to said recorded signature code signals, and comprising means for arming or disarming said antitheft means if said electrical signals correspond to said first record-

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40 ed signature code signal and means for performing a
second predetermined function in response to sig-
nals corresponding to said second recorded signa-
45 ture code signal, wherein said transmitter and said
receiver means cooperate to form a one-way radio
frequency signal transmission link for communica-
tion signals only from said transmitter to said
receiving means, said transmission link being
employed by said system during said programming
mode for transmitting said signal representative of
50 said transmitter code to said access control unit
to be stored in said memory means as signature code
signals, said link further employed during said
operating-receiving mode for transmitting said
encoded signal from said transmitter to said access
control unit.

94. A vehicle security system in which a control unit is
responsive to receipt of a proper transmitted encoded radio
frequency signal from a transmitter to arm or disarm said
system, comprising:

5 vehicle antitheft means, said means comprising a
vehicle ignition disabling means;

a portable hand-held transmitter comprising means
for generating and transmitting a predetermined fixed
digitally encoded, radio frequency, receiver-responsive
10 signal representative of a predetermined transmitter
code; and

a control unit located within said vehicle, compris-
ing:

(i) radio frequency signal receiving means
15 operable during said program mode and during said

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system operating-receiving mode for receiving said transmitted encoded signal and generating an electrical signal representative of the encoded signal;

(ii) a digital memory for storing signature code signals;

(iii) programming means for recording in said digital memory received signals for arming or disarming said vehicle antitheft means, said means activated only during a system program mode for automatically storing in said memory said electrical signals representative of a plurality of said radio frequency, receiver-responsive received signals of different code bit lengths representative of a plurality of predetermined transmitter codes of different code bit lengths as signature code signals for arming or disarming said vehicle antitheft means; and

(iv) operating means activated during an operating-receiving mode for comparing received electrical signals of different bit lengths with said signature code signals stored in said memory means to determine if said electrical signals correspond to one of said recorded signature code signals and for arming or disarming said antitheft means if said electrical signals correspond to one of said recorded signature code signals, wherein said transmitter and said receiver means cooperate to form a one-way radio frequency signal transmission link for communication signals only from said transmitter to said receiving means, said transmission link being employed by said system during said programming mode for transmitting said signal

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